

THE MINERAL INDUSTRY OF INDIA

By Chin S. Kuo

India's economic growth in 2003 was partly attributable to an excellent monsoon season in the country that contributed to an increase in agricultural production. The growth rate of gross domestic product (GDP) was moderate at 5.6% compared with 4.7% in 2002. Agriculture contributed 25% of the country's GDP, and the industry and service sectors accounted for 26% and 49% of GDP, respectively. Economic growth was constrained by inadequate infrastructure, cumbersome bureaucratic procedures, and high interest rates. The Government's \$10-billion nationwide road-construction program was expected to be a boon for the cement and steel industries (Wall Street Journal, 2003).

The United States was India's largest trading partner with bilateral trade of \$13 billion in 2003. Principal U.S. exports to India were advanced machinery, aircraft and parts, computer hardware, ferrous waste and scrap metal, and fertilizers. Major U.S. imports from India included agricultural and related products, chemicals, gems and jewelry, leather products, and textiles and ready-made garments. The United States also was India's largest investment partner. Foreign investment in India was particularly sought after in mining, petroleum exploration and processing, ports, power generation, roads, and telecommunications (U.S. Department of State, 2004).

India is endowed with significant mineral resources. Metal production was dominated by bauxite, chromite, copper, gold, iron, lead, manganese, silver, tin, and zinc. Output of industrial minerals was mainly barite, dolomite, gypsum, kaolin, limestone, magnesite, phosphate rock, and steatite. India was the world's leading producer of mica; it ranked 3d in the production of barite, chromite, and coal and lignite; 4th in iron ore; 6th in bauxite; 7th in manganese ore; 10th in crude steel; and 11th in aluminum (Indian Bureau of Mines, 2003).

The Mines and Geology Department of the State of Andhra Pradesh discovered a uranium deposit in Nalgonda district. The Government-owned Uranium Corp. of India applied for a mining lease for the deposit (Mining Journal, 2003b).

Government Policies and Programs

A committee appointed by the Government suggested that top import customs duties should be reduced to 25% from the present 30%. The import duty on ferroalloys could be reduced to 20% from the current 25%. It also proposed that in 2 to 3 years there should be only two levels of customs duty—10% on raw materials and 20% on finished products. Ferroalloys, nonferrous metals, and steel would come under the 10% duty. Ferroalloys producers opposed the committee's recommendations because they feared that they would not be able to compete with low-cost foreign producers (Metal Bulletin, 2003i).

The Government reduced the basic customs duty on imported metallurgical coke to 5% from 15%. India imported 3 million metric tons per year (Mt/yr) of metallurgical coke. The Government also abolished the dumping duty on metallurgical coke imported from China (Metal Bulletin, 2003d).

The customs duty on gold bars and coins was cut to \$2.10 per 10 grams from \$5.25. The import tariff on polished diamonds and gemstones was cut to 5% from 15%. The Government also abolished the customs duty on colored rough gemstones and semi-processed, half-cut, and broken diamonds (Reuters, 2003b§¹).

The Government withdrew the 4% special additional duty on phosphate rock and sulfur imports. However, the 5% import duty on these imports remained in effect (Fertilizer Week, 2003a).

Commodity Review

Metals

Aluminum.—Five companies were engaged in the manufacture of alumina and aluminum: Bharat Aluminium Co. Ltd. (Balco), Hindalco Industries Ltd., Indian Aluminium Co. Ltd. (Indal), Madras Aluminium Co. Ltd. (Malco), and National Aluminium Co. Ltd. Of these, Hindalco, Indal, and Malco were private companies. India's total installed production capacities for alumina and aluminum were 2.487 Mt/yr and 714,000 metric tons per year (t/yr), respectively.

Continental Resources Ltd. of the United States planned to initiate a baseline study on the Gandhamardan bauxite deposit in the Balangir area of eastern India. The baseline study involved mainly environmental work and began in summer 2003. The deposit was found to consist of good-grade bauxite ore in excess of 200 million metric tons (Mt) with 45.75% aluminum oxide. Continental Resources held 50% of the rights to the deposit (Balaton Power Inc., 2003).

Hindalco resumed operations at one of its bauxite mines, the Gurdari Mine in Jharkland, which stopped production because of equipment damage in December 2002. The mine supplied 10% of the company's bauxite needs. Hindalco was in the process of expanding the capacity of its aluminum smelter at Renukoot in Uttar Pradesh by 100,000 t/yr to 342,000 t/yr. The project was scheduled for completion in September 2003 (Reuters, 2003a§). The company planned to raise capacity further to 360,000 t/yr by March 2005 by removing bottlenecks, adding equipment, and installing a 41-megawatt (MW) power unit.

¹ References that include a section mark (§) are found in the Internet References Cited section.

The State government of Orissa withdrew its consent for Balco to lease the Sashubahumali-Pasangamali bauxite mines in Kashipur, Rayagada district because Balco failed to agree to set up a greenfield alumina refinery in Orissa. Sterlite Industries Ltd. owned 51% of Balco. Sterlite Industries also proposed to build a \$735 million 1-Mt/yr alumina refinery in Kalahandi district based on another bauxite deposit near the Langigarh bauxite mines (Mining Journal, 2003c).

Gujarat Alumina & Bauxite Ltd. (GABL) planned to set up a 100,000-t/yr aluminum smelter to complement its proposed 750,000-t/yr alumina refinery, which would use the bauxite deposits in Gujarat. Jefferies & Co. and Ambassador Group International, both of the United States, owned a 45% stake in GABL; the public and promoters owned the remaining 55%. The proposal also called for setting up a 100-MW captive powerplant and a 1.15-Mt/yr metallurgical coke unit. Total investment in the project was \$730 million (Projects Today, 2003a§).

Indal deferred the closure of its 14,000-t/yr aluminum smelter at Alupurram in Kerala because the State government agreed to reduce the power tariff on the plant. Indal also had an extrusion plant at Alupurram. The company planned to explore the possibility of setting up a captive coal-based powerplant of 30 MW at a cost of \$22 million or importing power from Orissa where Indal had a captive powerplant (Metal Bulletin, 2003c).

The Government decided to sell its remaining 36% stake in Balco. Sterlite Industries had purchased 51% from the Government's then 87% stake in Balco in 2001. Balco had a capacity to produce 100,000 t/yr of aluminum (Metal Pages, 2003c§).

Chromium.—A proposed joint-venture project was to exploit the Tangarpada chromite mines that covered 550 hectares in the Sukinda area in Orissa and contained ore reserves of 20 Mt. Jindal Strips won the mining rights and an 89% interest in the project; the remaining 11% share was to be held by Industrial Development Corp. of Orissa Ltd. (IDCOL). IDCOL operated a 15,000-t/yr ferrochrome plant at Jaipur Road in Orissa and held mining rights for chromite at the Tailangi mines (Metal Bulletin, 2003h).

Copper.—The feed requirements of Indian primary copper producers were met by indigenous copper ore and imported concentrates. Only Hindustan Copper Co. Ltd. (HCL) mined low-grade copper ore from underground mines in addition to importing copper concentrates. Sterlite Industries and Birla Copper used imported concentrates. Total copper production capacity in India was 347,500 t/yr.

Annual demand for copper for the next 5 years was expected to increase by 8% to 8.5%. Indigenous metal production capacity was expected to increase to 600,000 t/yr. Exports of copper and copper alloy semimanufactures and industrial products were on the rise. The import of refined metal was expected to continue its downward trend, whereas import of copper scrap was likely to continue to rise (Metal Pages, 2003a§).

HCL's Khetri copper mines in Rajasthan were uneconomic and could be closed or have the current workforce of 9,000 reduced to 2,600. The mines had a combined capacity of 12,000 t/yr of copper in concentrate. The Khetri copper complex also included a smelter and a refinery with a capacity of 31,000 t/yr of copper cathode. The mines had minable reserves of 10.77 Mt grading 1.15% copper; however, the cost to develop and exploit the reserves was too high. HCL was up for privatization. Potential buyers were Birla Copper and Sterlite Industries (Metal Bulletin, 2003b).

The Government revived plans to privatize HCL by selling its entire 98.95% holding in the company. HCL's total copper capacity accounted for 12% of the Indian copper-cathode market. In addition to the Khetri copper complex, the company owned the copper complex in Jharkhand that comprised the Surda Mine and a smelter-refinery at Ghatsila that had a capacity of 16,500 t/yr of copper cathode. HCL also owned the Malanjkhand open-pit copper mine in Madhya Pradesh with a capacity of 20,000 t/yr of copper in concentrate. In Maharashtra, HCL owned the Taloja copper-rod plant that had a capacity of 60,000 t/yr of continuous-cast rod (Mining Journal, 2003a).

Expansion of Birla Copper's Dahej smelter in Gujarat to 250,000 t/yr was expected to be completed in 2003. The company currently required 600,000 t/yr of copper concentrates, which could rise to 1 Mt/yr when the expansion is complete. Birla Copper received its concentrate supplies from South America and North America. About 80% of concentrate supplies was acquired through long-term contracts, and 20% was obtained on a spot basis (Metal Bulletin, 2003a).

Iron and Steel.—Mineral Enterprise Ltd., which was an iron ore producer and exporter in the Bellary Hospet region, had a license to mine up to 50 Mt of iron ore. The company sought to sell 24% of its equity shares to Cargill Exports of the United States and Kanematsu Corp. of Japan. Both Cargill and Kanematsu wanted tie-ups to secure their ore supplies. In 2003, Mineral Enterprises sold 400,000 metric tons (t) of iron ore in the domestic market, mostly to Visvesvaraya Iron and Steel and Kudremukh Iron Ore Co. Ltd.'s pig iron plant, and exported 800,000 t, which included 60,000 t sent to China from New Mangalore Port. The ore would be purchased by Kanematsu on behalf of Baosteel of China (Metal Bulletin, 2003e).

Tata Iron and Steel Co. Ltd. planned to expand its steel production capacity in Jharkhand in two phases. During the first phase, capacity would increase to 5 Mt/yr from 4 Mt/yr at a cost of \$435 million; during the second phase, to 6.5 Mt/yr at a cost of \$544 million. The company also planned to increase its iron ore capacity to 11 Mt/yr from 7.5 Mt/yr, its pyroxenite capacity to 0.4 Mt/yr from 0.3 Mt/yr, and its coal capacity to 12 Mt/yr from 9 Mt/yr during the first phase at a cost of \$195 million. During the second phase, the production capacities of iron ore, pyroxenite, and coal would be increased to 13 Mt/yr, 0.5 Mt/yr, and 15 Mt/yr, respectively, at a cost of \$348 million (Projects Today, 2003b§).

Jindal Steel and Power Ltd. was to double its hot-briquetted-iron capacity to 1.3 Mt/yr during the next 3 years. The \$120 million expansion also included the cost of increasing power generation capacity by 50 MW. The project was due for completion in September 2005. The company also planned to add 750,000 t/yr of long products capacity by March 2005 (Metal Bulletin, 2003g).

Monnet Ispat Ltd., which was a leading producer of direct-reduced iron (DRI) in India, was expanding its DRI operations by building kilns that could boost capacity by 440,000 t/yr at a cost of \$49.5 million. The plant would be located close to a coal mine to reduce the cost of obtaining raw material (Metal Bulletin, 2003f).

Maharashtra Elektros melt, which was India's largest manganese-ferroalloys producer, shut down one of its two 32-megavoltampere furnaces after a transformer burned out at its Chandrapur plant. The furnace, which produced about 48,000 t/yr of high-carbon ferromanganese, would be idled for 6 months. Meanwhile, Chattisgarh Power Co. was adding two furnaces; the first was scheduled to become operational in June and would have a capacity of 15,000 t/yr of high-carbon ferromanganese. Indsil Electros melts restarted two furnaces previously idled by Nava Bharat Ferroalloys; the furnaces had capacities of 4,000 t/yr of silicomanganese and 4,000 t/yr of high-carbon ferromanganese, respectively (Metal Bulletin Research, 2003).

Lead and Zinc.—India's demonstrated reserves of lead and zinc ores were estimated to be 176.8 Mt that contained 2.38 Mt of lead and 9.7 Mt of zinc. The smelting capacities of primary lead and zinc were 43,000 t/yr from Hindustan Zinc Ltd. (HZL) and 199,000 t/yr from Binani Industries Ltd. and HZL, respectively. In addition, secondary lead and zinc were produced from dross, residue, and scrap.

HZL planned to double the capacity of its lead and zinc smelters at Chanderiya, Rajasthan, from 43,000 t/yr and 169,000 t/yr, respectively, to 86,000 t/yr and 338,000 t/yr. It also planned to expand the capacity of its beneficiation plant at the Rampura Agucha lead and zinc mine in Rajasthan to 3.75 Mt/yr from 2 Mt/yr, and to set up a 150-MW powerplant. HZL chose state-owned Bharat Heavy Electricals Ltd. to construct the \$86.7 million powerplant. The expansion of the smelters was expected to be commissioned in September 2004. HZL was managed by Sterlite Industries, which had acquired a controlling stake in HZL from the Government in 2002 under a privatization program (Metal Pages, 2003b\$).

Industrial Minerals

Cement.—India's demand for cement could not keep up with its capacity buildup. In 2003, the first phase of the National Highways Development Project was estimated to generate cement demand of 10 Mt. The growth of the housing sector also gradually increased the demand for cement. A demand growth of 5% was anticipated during 2004. The country's total cement production was around 100 Mt in 2003 owing to a recovery in capital expenditure. Lafarge S.A. of France acquired a cement production capacity of 5 Mt/yr in India (Building Bulletin, 2003).

Larsen & Toubro Ltd. (L&T) of India decided to spin off its cement business into a new company called CemCo. L&T held 20% of the equity of CemCo and the balance was distributed to L&T's shareholders. Subsequently, Grasim Industries Ltd. acquired 8.5% stake of CemCo from L&T and made an open offer for 30% of the equity of CemCo with a view toward taking management control. The transaction was expected to strengthen CemCo's ability to compete in the Indian and overseas markets (Larsen & Toubro Ltd., 2003\$).

Orissa Cement Ltd. ordered a 250-metric-ton-per-hour cement mill, which was the company's third vertical roller mill, for cement and slag grinding. It was equipped with six rollers and was identical to the two mills that were already in operation. The mill was scheduled to start production in September 2004 (World Cement, 2003).

Diamond.—Dwyka Diamonds Ltd. of Australia explored for diamond in India with some encouraging results. The second phase sampling program of AMIL License A and B areas was successful with five high priority targets identified away from the four known pipes. Ground magnetic surveys completed within the priority 003 and 017 drainages highlighted seven magnetic targets. Ground magnetic surveys were being carried out over new targets in the Chigucherla East and the priority 022 drainage areas (Dwyka Diamonds Ltd., 2003\$).

Nitrogen (Fertilizers).—IFFCO suspended production at its 1,650-metric-ton-per-day urea plant in Kalol in March owing to a shortage in natural gas feedstock. The plant, which used naphtha and natural gas interchangeably, served the markets in Gujarat, Madhya Pradesh, Maharashtra, and Rajasthan. High naphtha prices made it unviable for IFFCO's Kalol plant to switch to naphtha for feedstock (Fertilizer Week, 2003b).

Salt.—India has achieved self-sufficiency in salt for both human consumption and industry and the country was a salt exporter. The State of Gujarat was the center of India's salt industry and accounted for 73% of total production (Washington Post, The, 2003). A small amount of rock salt was produced by Hindustan Salts Ltd. at Guma Mine in the Mandi district of Himachal Pradesh.

Mineral Fuels

Coal.—The privatization of coal mines remained uncertain. The Coal Mines Nationalization (Amendment) Bill, which would allow private sector coal mining, was not scheduled to be discussed in the winter session of the Parliament. In 2003, there was a need for private sector investment in the coal industry and a lack of funds from the Government for increasing coal production to meet the growing demand. India's demand for coal was expected to increase to 460 Mt in 2004 and production was expected to increase only to 405 Mt. The nationalized coal companies and private investors would work to fulfill the country's needs (Coal Age, 2003).

Coal India Ltd. found nine new reserves of coalbed methane gas of around 440 billion cubic meters in seven states. About 182.3 billion cubic meters of gas reserves were found in lignite deposits of Rajasthan and about 87.2 billion cubic meters were found in Gujarat. Methane deposits also were found in Jharkhand (54 billion cubic meters), Chattisgarh (33.9 billion cubic meters), Andhra Pradesh (29.7 billion cubic meters), Madhya Pradesh (29.3 billion cubic meters), and Maharashtra (19.9 billion cubic meters) (Alexander's Gas & Oil Connections, 2003a\$).

Natural Gas.—Niko Resources and Reliance Industries made a huge gas discovery in Block D6, 26 kilometers (km) off the east coast of India. The D1 exploration well encountered in excess of 100 meters (m) of net gas pay in depth. With the first six wells drilled, the estimated in-place gas reserves for the block were 295 billion cubic meters. A 2,500-square-kilometer three-dimensional

seismic survey would be shot in October to identify targets for a second drilling program. Niko Resources had a 10% working interest in the project (Rig Zone, 2003b§).

The Andaman and Nicobar Islands in the Bay of Bengal were the setting for vast unexplored natural gas resources estimated to be approximately 610 Mt of oil and oil equivalent gas. Fresh seismic surveys had upwardly revised the estimated resources from 180 Mt of oil and oil equivalent gas. Two blocks in the Andaman region were among 24 oil and gas blocks on offer in the fourth new exploration licensing round (Rig Zone, 2003a§).

India agreed to import liquefied natural gas (LNG) in phases from Iran under a 25-year contract and would receive 2.5 Mt in fiscal year 2007-08 and 5 Mt/yr beginning in 2012. The Government was expected to build a fourth LNG import terminal on the country's west coast to receive and process the LNG. Indian Oil Corp. also renewed its contract with National Iranian Oil Corp. to import 5 Mt of crude oil during fiscal year 2003-04 (Oil & Gas Journal, 2003b).

Petronet LNG, which was the state-owned LNG consortium, planned to double the capacity of its LNG receiving terminal at Dahej in the State of Gujarat to 10 Mt/yr in response to an expected rise in LNG demand in India. Work was nearing completion on the 5-Mt/yr Dahej terminal. Petronet also could construct a 2.5-Mt/yr LNG terminal at Kochi in the State of Kerala. Petronet was hopeful that National Thermal Power Corp. would buy 3 Mt/yr of LNG and negotiated with its supplier for a reduction in the price of LNG. In addition, the Government reduced the customs duty on the importation of regasification plants and machinery to 5% from 25% (Oil & Gas Journal, 2003c).

A joint Indo-Iran panel proposed three options to transport natural gas from Iran to India: a land pipeline, a deep-sea pipeline, and sea tankers. Both countries studied the feasibility of an onshore pipeline or an offshore pipeline. The proposed \$3.5 billion land pipeline would run 2,600 km from Iran, through the Pakistani province of Sindh, to India. The offshore gas pipeline would run from the Assaluyen Gasfield in southern Iran to India and would bypass the exclusive economic zone of Pakistan. The Government of India favored the underwater pipeline to avoid potential disruptions in supplies (Alexander's Gas & Oil Connections, 2003b§).

Petroleum.—Oil and Natural Gas Corp. (ONGC) planned to commence a \$390 million deepwater exploration campaign and expected to spend \$1.2 billion per year thereafter in exploration activities to increase its crude oil production from deepwater fields. ONGC also awarded a \$137 million, 3-year contract to Transocean Inc. of the United States for its Discoverer Seven Seas deepwater ship to drill offshore India. The ship was capable of drilling in water as deep as 2,130 m. The project was expected to begin in the first quarter of 2004 (Oil & Gas Journal, 2003a).

During the past 3 years, discoveries of oil and gas added 300 Mt of oil and oil equivalent gas to India's hydrocarbon reserves. They included the gas finds by Reliance Industries in the deep waters of Krishna Godavari basin, by Cairn Energy of the United Kingdom in the same area, and by Niko Resources in an onland block in Surat, Gujarat. ONGC also made a large offshore oil and gas discovery west of Bassein Field (Alexander's Gas & Oil Connections, 2003c§).

Bharat Petroleum Corp. Ltd., which was to be privatized through a public offering, would complete its 6-Mt/yr refinery at Bina, Madhya Pradesh, on its own at a cost of \$1.34 billion. Bharat had been cleared to increase its equity in the refinery from 26% to 50%. Oman Oil would hold 2% of the refinery's equity and the balance would be raised from financial institutions and the public (Petroleum Economist, 2003).

Indian Oil Corp. launched its Panipat refinery expansion and paraxylene/purified terephthalic acid (PTA) project at a combined investment of about \$2.2 billion. The 6-Mt/yr Panipat refinery in the State of Haryana would be expanded to a capacity of 12 Mt/yr with matching processing facilities. The paraxylene/PTA project, which was expected to cost \$1.12 billion, was to manufacture PTA and paraxylene from naphtha. Naphtha would be sourced from the Panipat refinery and the company's Mathura refinery in the State of Uttar Pradesh. The paraxylene/PTA plant was scheduled for commissioning in the first quarter of 2004 (Platts News, 2003§).

Infrastructure

Chennai Port Trust shifted its coal handling to the new Ennore Port. Meanwhile, a memorandum of understanding was signed between Chennai Port Trust and Chennai Petroleum Corp. Ltd. for a period of 30 years to handle petroleum products at concession rates. Chennai Petroleum planned to increase its crude oil processing capacity to 9.5 Mt/yr from 6 Mt/yr (Times of India, 2003§).

Outlook

India's economic growth in terms of GDP is expected to increase slightly to 6% in 2004. The country's mining activities are expected to remain about the same level as those of 2003. Production of aluminum is expected to increase because of the capacity expansion at Hindalco's aluminum smelter. Increasing imports of copper concentrates from North America and South America are foreseen to satisfy the need of the expanded copper smelters. Output of steel also is expected to increase gradually owing to Tata and Steel's planned capacity expansion. HZL's completed expansion of its lead and zinc smelters in late 2004 will add significant amount of lead and zinc metals to the domestic market. Offshore exploration activities are expected to intensify during the next 2 years with the encouragement of some success in the discovery of oil and gas.

References Cited

- Balaton Power Inc., 2003, Balaton's Continental Resources Ltd. is ready to initiate bauxite baseline study: Hutchinson, Kansas, Balaton Power Inc. press release, April 5, p. 1.
Building Bulletin, 2003, Improving Indian markets: International Cement Review, issue 67, November, p. 3.

Coal Age, 2003, Privatizing Indian coal mines remains uncertain: Coal Age, v. 108, no. 9, October, p. 13.
 Fertilizer Week, 2003a, Midweek briefing: Fertilizer Week, March 5, p. 3.
 Fertilizer Week, 2003b, Midweek briefing: Fertilizer Week, March 26, p. 5.
 Indian Bureau of Mines, 2003, Minerals Yearbook: Nagpur, India, Indian Bureau of Mines, December, p. 1-5.
 Metal Bulletin, 2003a, Aditya Birla Group in Nifty move for concs supply: Metal Bulletin, no. 8744, January 30, p. 5.
 Metal Bulletin, 2003b, HCL mines threatened with closure: Metal Bulletin, no. 8737, January 6, p. 6.
 Metal Bulletin, 2003c, Indal delays closure of smelter: Metal Bulletin, no. 8737, January 6, p. 5.
 Metal Bulletin, 2003d, Orissa chrome ore sell-off is challenged: Metal Bulletin, no. 8739, January 13, p. 17.
 Metal Bulletin, 2003e, Indian iron ore miner links with buyers: Metal Bulletin, no. 8816, October 6, p. 32.
 Metal Bulletin, 2003f, Iron and steel: Metal Bulletin, no. 8820, December 15, p. 28.
 Metal Bulletin, 2003g, Jindal doubles HBI capacity: Metal Bulletin, no. 8783, June 19, p. 18.
 Metal Bulletin, 2003h, Orissa chrome ore sell-off is challenged: Metal Bulletin, no. 8750, February 20, p. 8.
 Metal Bulletin, 2003i, Spectre of duty cut scares Indian ferroalloys industry: Metal Bulletin, no. 8744, January 30, p. 9.
 Metal Bulletin Research, 2003, Indian suppliers to increase focus on home market: Metal Bulletin Research, no. 129, May, p. 7.
 Mining Journal, 2003a, HCL privatization back on: Mining Journal, v. 341, no. 8745, July 18, p. 37.
 Mining Journal, 2003b, Indian uranium discovery: Mining Journal, v. 340, no. 8725, February 28, p. 147.
 Mining Journal, 2003c, Orissa withdraws offer to Balco: Mining Journal, v. 340, no. 8728, March 21, p. 200.
 Oil & Gas Journal, 2003a, Drilling: Oil & Gas Journal, v. 101, no. 32, August 18, p. 9.
 Oil & Gas Journal, 2003b, LNG: Oil & Gas Journal, v. 101, no. 22, June 2, p. 9.
 Oil & Gas Journal, 2003c, Quick takes: Oil & Gas Journal, v. 101, no. 30, August 4, p. 8.
 Petroleum Economist, 2003, News in brief: Petroleum Economist, v. 70, no. 6, June, p. 46.
 U.S. Department of State, 2004, India, Background note: U.S. Department of State, January, p. 8.
 Wall Street Journal, 2003, World watch: New York, New York, Wall Street Journal, September 25, p. A13.
 Washington Post, The, 2003, Hard times for India's salt of the earth: Washington Post, The, December 7, p. A25.
 World Cement, 2003, International roundup: Surrey, United Kingdom, World Cement, November, p. 212.

Internet References Cited

Alexander's Gas & Oil Connections, 2003a (July 10), Coal India finds methane gas reserves, accessed August 8, 2003, at URL <http://www.gasandoil.com/goc/discover/dix32837.htm>.
 Alexander's Gas & Oil Connections, 2003b (August 21), India says no to gas pipeline passing through Pakistan, accessed August 25, 2003, at URL <http://www.gasandoil.com/goc/news/nts33472.htm>.
 Alexander's Gas & Oil Connections, 2003c (June 26), Spurt in oil discoveries adds oil and gas reserves to India, accessed June 27, 2003, at URL <http://www.gasandoil.com/goc/news/nts32641.htm>.
 Dwyka Diamonds Ltd., 2003 (September 30), Quarterly report, accessed October 10, 2003, at URL <http://www.dwykadiamonds.com>.
 Larsen & Toubro Ltd., 2003 (June 17), L&T to demerge cement business, accessed November 20, 2003, at URL <http://www.larsentoubro.com/news/upload/cyber-rt/cemdemerger.htm>.
 Metal Pages, 2003a (September 16), Copper demand to increase by 8-8.5%—ICDC, accessed September 16, 2003 at URL <http://www.metal-pages.com>.
 Metal Pages, 2003b (July 1), Hindustan Zinc to double zinc and lead capacity, accessed July 2, 2003, at URL <http://www.metal-pages.com/printnews.asp?Newsid=11188>.
 Metal Pages, 2003c (July 11), Indian government to sell off residue stake in Balco, accessed July 14, 2003, at URL <http://www.metal-pages.com/printnews.asp?Newsid=11310>.
 Platts News, 2003 (October 19), India IOC launches Panipat refinery expansion, petchem project, accessed October 20, 2003, at URL <http://www.platts.com/archives/104189.html>.
 Projects Today, 2003a (February 19), Gujarat Alumina plans aluminum smelter, accessed February 23, 2003, at URL http://www.projectstoday.com/news/industry/_pr.asp?id=9031.
 Projects Today, 2003b (January 22), Tata Steel plans major investment in Jharkhand, accessed February 23, 2003, at URL http://www.projectstoday.com/news/industry/_pr.asp?id=8801.
 Reuters, 2003a (February 7), India Hindalco may resume Gurdari mining in 2 months, accessed February 7, 2003, at URL http://biz.yahoo.com/rm/030207/minerals_india_hindalco_1.html.
 Reuters, 2003b (February 28), Indian exports seen rising on gold, gems duty cut, accessed February 28, 2003, at URL http://biz.yahoo.com/rm/030228/minerals_india_gold_2.htm.
 Rig Zone, 2003a (May 20), Indian maps huge gas reserves around Andaman islands, accessed May 21, 2003, at URL http://www.rigzone.com/news/article_pf.asp?a_id=6710.
 Rig Zone, 2003b (April 28), Niko & Reliance make huge gas discovery offshore India, accessed April 29, 2003, at URL http://www.rigzone.com/news/article_pf.asp?a_id=6425.
 Times of India, 2003 (April 2), Chennai port to start handling new cargo, accessed April 2, 2003, at URL <http://www1.timesofindia.indiatimes.com/cms.d11/html/uncomp/articleshow?ms-d=42190064>.

Major Sources of Information

Geological Survey of India
 27 Jawaharal Nehru Rd.
 Kolkata 700 016, India
 Telephone: 33 2496976
 Fax: 33 2496956
 Indian Bureau of Mines
 New Secretariat Building
 Nagpur 440 001, India
 Telephone: 712 534642, 523934
 Fax: 712 533041

National Mineral Development Corp.
Khanij Bhawan, 10-3-311/A, Castle Hills
Masab Tank, Hyderabad 500 028, India
Telephone: 40 222071, 222072
Fax: 40 222236

Oil and Natural Gas Corp.
12th Floor, Express Towers, Nariman Point
Mumbai 400 021, India
Telephone: 22 2026446, 2022559
Fax: 22 2027938

Major Publications

Balkrishna Binani:

Minerals and Metals Review, monthly.

Mining Engineers' Association of India:

Indian Mining and Engineering Journal, monthly.

Ministry of Mines, Indian Bureau of Mines:

Monthly Statistics of Mineral Production.

Indian Minerals Yearbook.

TABLE 1
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES ^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	1999	2000	2001	2002	2003
METALS					
Aluminum:					
Bauxite, gross weight thousand tons	6,712 ⁴	7,562 ⁴	7,864 ⁴	9,647 ^{r,4}	10,002 ⁴
Alumina, Al ₂ O ₃ equivalent do.	2,080	2,280	2,400	2,800	2,500
Metal, primary	614,400 ⁴	643,700 ⁴	624,000 ⁴	671,200 ⁴	798,300 ⁴
Cadmium metal	269 ⁴	314 ⁴	436 ⁴	466 ⁴	477 ⁴
Chromium, chromite, gross weight	1,472,766 ⁴	1,946,910 ⁴	1,677,924 ⁴	1,900,000	1,800,000
Cobalt metal	120	206 ⁴	250	270	255
Copper:					
Mine output, Cu content	34,100 ⁴	31,900 ⁴	32,400 ⁴	31,500 ^{r,4}	28,400 ⁴
Metal, primary:					
Smelter	224,400 ⁴	256,000 ⁴	293,000 ⁴	251,400 ⁴	252,000 ⁴
Refinery					
Electrolytic, cathode	200,000	234,000 ⁴	310,000 ⁴	353,700 ⁴	375,000 ⁴
Fire refined	8,000	9,000	18,000	20,000	19,000
Total	208,000	243,000	328,000	374,000	394,000
Gold metal, smelter kilograms	2,500 ⁴	6,200 ⁴	3,700 ⁴	3,800 ⁴	3,100 ⁴
Iron and steel:					
Iron ore and concentrate:					
Gross weight thousand tons	70,220 ⁴	75,950 ⁴	79,200 ⁴	80,000	85,000
Fe content do.	44,940 ⁴	48,600 ⁴	50,700 ⁴	51,200	54,400
Metal:					
Pig iron do.	20,139 ⁴	21,321 ⁴	21,900 ⁴	24,315 ^{r,4}	24,000
Direct-reduced iron do.	5,220 ⁴	5,440 ⁴	5,590 ⁴	5,731 ^{r,4}	5,800
Ferroalloys:					
Ferrochromium, including charge chrome	312,140 ⁴	376,693 ⁴	266,395 ⁴	311,927 ⁴	300,000
Ferrochromiumsilicon	10,000	10,000	10,000	10,000	10,000
Ferromanganese	160,000	160,000	165,000	165,000	165,000
Ferrosilicon	55,000	60,000	50,000	52,000	54,000
Silicomanganese	190,000	185,000	150,000	150,000	160,000
Other	9,000	9,000	9,000	9,000	9,000
Steel, crude thousand tons	24,269 ⁴	26,924 ⁴	27,291 ⁴	28,814 ⁴	31,779 ⁴
Semimanufactures ⁵ do.	12,000	12,000	13,000	13,500	14,000
Lead:					
Mine output, Pb content	32,100 ⁴	28,900 ⁴	25,600 ⁴	28,600 ^{r,4}	33,100 ⁴
Metal, refined:					
Primary	72,000	57,400 ^{r,4}	74,400 ^{r,4}	64,200 ^{r,4}	61,500 ⁴
Secondary	20,000	20,500 ^{r,4}	22,000 ^{r,4}	25,000 ^{r,4}	24,800 ⁴
Total	92,000	77,900 ^{r,4}	96,400 ^{r,4}	89,200 ^{r,4}	86,300 ⁴
Manganese:					
Ore and concentrate, gross weight thousand tons	1,500	1,550	1,600	1,700	1,650
Mn content do.	570	590	600	630	620
Rare-earth metals, monazite concentrate, gross weight	5,000	5,000	5,000	5,000	5,000
Selenium kilograms	11,500	11,500	11,500	11,500	12,000
Silver, mine and smelter output do.	54,000	40,000	49,500 ⁴	52,100 ⁴	53,600 ⁴
Titanium concentrates, gross weight:					
Ilmenite	378,000	380,000	430,000	460,000	500,000
Rutile	16,000	17,000	19,000	18,000	18,000
Zinc:					
Mine output, concentrate:					
Gross weight	265,000	264,000	270,000	234,300 ^{r,4}	294,200 ⁴
Zn content	145,000	144,000	146,000	129,000 ^r	162,000
Metal:					
Primary	175,000	176,000	207,000 ^{r,4}	231,400 ^{r,4}	253,900 ⁴
Secondary	25,000	25,000	25,000	24,000	24,000
Total	200,000	201,000	232,000 ^r	255,000 ^r	278,000
Zirconium concentrate, zircon, gross weight	19,000	19,000	19,000	19,000	20,000

See footnotes at end of table.

TABLE 1--Continued
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES ^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	1999	2000	2001	2002	2003
INDUSTRIAL MINERALS					
Abrasives, natural, n.e.s.:					
Corundum, natural kilograms	1,300	1,250	1,200	1,200	1,150
Garnet	135,000	130,000	125,000	120,000	120,000
Jasper	7,000	7,500	8,000	8,000	8,500
Asbestos	20,000	21,000	21,000	18,000	19,000
Barite	360,000	840,000	850,000	600,000	700,000
Bromine, elemental	1,500	1,500	1,500	1,500	1,500
Cement, hydraulic thousand tons	90,000	95,000	100,000	100,000	100,000
Chalk	115,000	110,000	110,000	110,000	115,000
Clays:					
Ball clay	380,000	375,000	370,000	400,000	390,000
Diaspore	12,000	13,000	13,000	12,000	12,000
Fireclay	340,000	345,000	350,000	355,000	360,000
Kaolin:					
Salable crude thousand tons	520	530	540	540	550
Processed do.	150	160	170	170	180
Total do.	670	690	710	710	730
Other do.	65	70	70	70	75
Diamond:					
Gem thousand carats	12	16	17	17	16
Industrial do.	29	41	43	45	44
Total do.	41	57	60	62	60
Feldspar	105,000	110,000	110,000	110,000	150,000
Fluorspar:					
Concentrates, metallurgical-grade	800	3,253 ^{r,4}	6,900 ^{r,4}	4,188 ^{r,4}	4,200
Other fluorspar materials, graded	5,600	3,782 ^{r,4}	13,866 ^{r,4}	6,296 ^{r,4}	6,300
Gemstones, excluding diamond:					
Agate, including chalcedony pebble	200	250	250	200	200
Garnet kilograms	900	850	900	700	800
Graphite ⁶	145,000	140,000	140,000	130,000	110,000
Gypsum	2,200,000	2,210,000	2,250,000	2,300,000	2,300,000
Kyanite and related materials:					
Kyanite	5,000	5,000	5,500	6,000	6,000
Sillimanite	12,000	12,000	13,000	14,000	14,000
Lime	300,000	310,000	320,000	310,000	310,000
Magnesite	360,000	365,000	370,000	380,000	380,000
Mica:					
Crude	1,500	1,500	1,300	1,500	1,600
Scrap and waste	1,000	950	1,100	2,000	2,000
Total	2,500	2,450	2,400	3,500	3,600
Nitrogen, N content of ammonia thousand tons	10,376 ⁴	10,148 ⁴	10,081 ⁴	9,827 ^{r,4}	9,708 ⁴
Phosphate rock, including apatite	1,262,000 ⁴	1,136,000 ⁴	1,200,000	1,250,000	1,180,000
Pigments, mineral, natural, ocher	380,000	336,000	355,000	360,000	365,000
Pyrites, gross weight	100,000	105,000	110,000	115,000	115,000
Salt:					
Rock salt thousand tons	3	3	3	3	3
Other do.	14,450 ⁴	14,450 ⁴	14,500	14,500	15,000
Total do.	14,500	14,500	14,500	14,500	15,000
Sand:					
Calcareous do.	235	240	245	250	250
Silica do.	1,300	1,350	1,400	1,400	1,500
Other do.	2,900	2,800	2,900	2,800	2,900

See footnotes at end of table.

TABLE 1--Continued
INDIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES ^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	1999	2000	2001	2002	2003
INDUSTRIAL MINERALS--Continued					
Slate	10,000	10,500	11,000	10,000	10,500
Soda ash	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Stone, sand and gravel:					
Calcite	50,000	50,500	51,000	51,000	52,000
Dolomite thousand tons	2,700	2,750	2,800	2,900	2,900
Limestone do.	110,000	105,000	110,000	115,000	120,000
Quartz and quartzite do.	265	260	270	250	250
Sulfur, byproduct from fertilizer plants	10,500	11,000	11,000	11,500	11,500
Talc and related materials:					
Pyrophyllite	85,000	85,000	86,000	85,000	86,000
Steatite, soapstone	535,000 ^r	545,000 ^r	546,000 ^r	550,000 ^r	552,000
Vermiculite	4,000	4,200	4,300	4,300	4,400
Wollastonite	96,000	100,000	100,000	105,000	120,000
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous thousand tons	290,400 ⁴	310,800 ⁴	320,500 ⁴	325,000	328,000
Lignite do.	24,000	24,000	23,000	24,000	25,000
Total do.	314,400 ⁴	334,800 ⁴	343,500 ⁴	349,000	353,000
Gas, natural:					
Gross million cubic meters	31,400 ⁴	30,000	25,519 ⁴	26,000	27,000
Marketable do.	29,500	28,500	24,000	25,000	25,000
Petroleum:					
Crude thousand 42-gallon barrels	241,119 ⁴	238,068 ⁴	239,292 ⁴	240,000	241,000
Refinery products:					
Liquefied petroleum gas do.	41,000	41,500	42,000	43,000	44,000
Gasoline do.	40,000	40,500	41,000	42,000	42,000
Kerosene and jet fuel do.	58,500	59,000	58,000	60,000	59,000
Distillate fuel oil do.	168,000	169,000	170,000	172,000	171,000
Residual fuel oil do.	69,000	68,000	67,000	69,000	70,000
Other do.	91,000	91,500	92,000	94,000	93,000
Total do.	468,000	470,000	470,000	480,000	479,000

^rRevised.

¹Table includes data available through July 15, 2004.

²Estimated data are rounded to no more than three significant digits; may not add to totals shown.

³In addition to commodities listed, other gemstones (aquamarine, emerald, ruby, and spinel) and uranium are produced, but output is not reported; available information is inadequate to make reliable estimates of output levels.

⁴Reported figure.

⁵Excludes production from steel miniplants.

⁶India's marketable production is 10% to 20% of mine production.

TABLE 2
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Alumina	Indian Aluminium Co. Ltd. [Indian interests, 60.4%; Alcan Aluminium Ltd. (Canada), 39.6%]	Belgaum Refinery, Karnataka	280
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Dhamanjodi Refinery, Orissa	1,050
Do.	Bharat Aluminium Co. Ltd. (Indian Government, 49%; Sterlite Industries Ltd., 51%)	Korba Refinery, Chhattisgarh	200
Do.	Utkal Alumina International Ltd. [Norsk Hydro A/S (Norway), 45%; Alcan Aluminium Ltd. (Canada), 35%; Hindalco Industries Ltd., 20%]	Koraput Refinery, Orissa	1,000 ¹
Do.	Madras Aluminium Co. Ltd. [Alumix SpA (Italian Government), 27%; R. Prabhu and Associates, 24%; Tamil Nadu Industrial Investment Corp., 11%; others, 38%]	Mettur Refinery, Tamil Nadu	60
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%; Alcan Aluminium Ltd. (Canada), 39.6%]	Muri Refinery, Jharkhand	88
Do.	Hindalco Aluminium Co. Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Renukoot Refinery, Uttar Pradesh	450
Aluminum	Indian Aluminium Co. Ltd. [Indian interests, 60.4%; Alcan Aluminium Ltd. (Canada), 39.6%]	Alupuram Smelter, Kerala	20
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Angul Smelter, Orissa	230
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%; Alcan Aluminium Ltd. (Canada), 39.6%]	Belgaum Smelter, Karnataka	70
Do.	do.	Hirakud Smelter, Orissa	30
Do.	Bharat Aluminium Co. Ltd. (Indian Government, 49%; Sterlite Industries Ltd., 51%)	Korba Smelter, Chhattisgarh	100
Do.	Madras Aluminium Co. Ltd. [Alumix SpA (Italian Government), 27%; R. Prabhu and Associates, 24%; Tamil Nadu Industrial Investment Corp., 11%; others, 38%]	Mettur Smelter, Tamil Nadu	25
Do.	Hindalco Aluminium Co. Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Renukoot Smelter, Uttar Pradesh	275
Bauxite	Bharat Aluminium Co. Ltd. (Indian Government, 49%; Sterlite Industries Ltd., 51%)	Amarkantak Mine, Madhya Pradesh	200
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%; Alcan Aluminium Ltd. (Canada), 39.6%]	Kolhapur District mines, Maharashtra	600
Do.	Gujarat Mineral Development Corp. (Gujarat State Government, 100%)	Kutch and Saurashtra Mines, Gujarat	500
Do.	Hindalco Aluminium Co. Ltd. (Birla Group, 33%; foreign investors, 26%; private Indian investors, 23%; financial institutions, 18%)	Lohardarga District mines, Jharkland	750
Do.	Indian Aluminium Co. Ltd. [Indian interests, 60.4%; Alcan Aluminium Ltd. (Canada), 39.6%]	do.	200
Do.	National Aluminium Co. Ltd. (Indian Government, 100%)	Panchpatmali Hills, Koraput District mines Orissa	2,400
Do.	Minerals & Minerals Ltd. (Indian Government, 100%)	Richuguta, Palamau District mines, Jharkland	200
Barite	Andhra Pradesh Mineral Development Corp. Ltd. (Andhra Pradesh State Government, 100%)	Cuddapah District mines, Andhra Pradesh	350
Do.	Associated Mineral Corp.	do.	75
Do.	Pragathi Minerals	do.	50
Do.	Shri C. M. Ram nath Reddy	do.	75
Do.	Vijaylaxmi Minerals Trading Co.	do.	50
Borax	Borax Morarji Ltd.	Ambernath, Maharashtra	17
Cement	Larsen and Toubro Ltd.	Awarpur Plant, Maharashtra	2,300
Do.	Century Cement (Century Textiles and Industries Ltd., a subsidiary of the Birla Group, 100%)	Baikunth Plant, Madhya Pradesh	1,120
Do.	Coromandel Fertilizers Ltd. [Chevron Chemical Co. (United States), 23.55%; International Minerals and Chemical Co., 20.89%; Parry and Co., 10.64%; E.I.D. Parry (India) Ltd., 6.65%; others, 38.27%]	Chilamkur Plant, Andhra Pradesh	1,000

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Cement--Continued:		The Associated Cement Cos. Ltd. (Indian Government, 34.86%; private shareholders, 65.14%)	Gagal Plant, Himachal Pradesh	1,830
Do.		Raymond Cement Works (a division of Raymond Woolen Mills Ltd., J K Singhania, principal shareholder)	Gopalnagar Plant, Madhya Pradesh	1,250
Do.		Narmada Cement Co. Ltd. (Chowgule and Co. Ltd., 34%; Gujarat State Government, 17.33%; others, 48.67%)	Jafrabad Plant, Gujarat	1,000
Do.		Rajashree Cement (a division of Indian Rayon and Industries Ltd., 100%)	Khor Plant, Karnataka	1,020
Do.		The Associated Cement Cos. Ltd. (Indian Government, 34.86%; private shareholders, 65.14%)	Kymore Plant, Madhya Pradesh	1,500
Do.		Mangalam Cement Ltd.	Morak Plant, Rajasthan	1,000
Do.		Mysore Cements Ltd. (Government institutions and banks, 41.13%; Corporate Trust Holdings, 21.70%; others, 37.17%)	Narasingarh Plant, Madhya Pradesh	1,089
Do.		Cement Corp. of India Ltd. (Indian Government, 100%)	Nayagaon Plant, Madhya Pradesh	1,330
Do.		J K Cement Works (a division of J K Synthetics Ltd., 100%)	Nimbahera Plant, Rajasthan	1,462
Do.		The India Cement Co. Ltd. (Indian Government, 26%; Life Insurance Corp. of India, 24%; others, 50%)	Sankarnagar Plant, Tamil Nadu	1,000
Do.		Maihar Cement (Century Textiles and Industries Ltd., a subsidiary of the Birla Group, 100%)	Satna Plant, Madhya Pradesh	1,800
Do.		Shree Digvijay Cement Co. Ltd.	Shreeniwas Plant, Maharashtra	1,060
Do.		Lakshmi Cement (a division of Straw Products Ltd., J K Singhania, principal shareholder)	Sirohi Plant, Rajasthan	1,400
Do.		Manikgarth Cement (Century Textiles and Industries Ltd., a subsidiary of the Birla Group, 100%)	Tehsil Rajura Plant, Maharashtra	1,000
Do.		Vasavadatta Cement (Kesoram Industries Ltd., 100%)	Vasavadatta Plant, Karnataka	1,000
Do.		Vikram Cement (Grasim Industries Ltd., a subsidiary of Birla Group, 100%)	Vikram Plant, Madhya Pradesh	1,000
Do.		Raasi Cement Ltd. (Andhra Pradesh Government, 50%, and Development Co. Ltd., 50%)	Vishnupuram Plant, Andhra Pradesh	1,000
Do.		The Associated Cement Cos. Ltd. (Indian Government, 34.86%; private shareholders, 65.14%)	Wadi Plant, Karnataka	2,180
Chromite		Ferro Alloys Corp. Ltd.	Cuttack District, Orissa	120
Do.		Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	300
Do.		Tata Iron and Steel Co. Ltd.	do.	100
Do.		Ferro Alloys Corp. Ltd.	Dhenkanal District, Orissa	75
Do.		Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	200
Do.		Mysore Minerals Ltd.	Hassan District, Karnataka	125
Do.		Ferro Alloys Corp. Ltd.	Kendujhar District, Orissa	75
Do.		Orissa Mining Corp. Ltd. (Orissa Industries Ltd., 100%)	do.	100
Do.		Ferro Alloys Corp. Ltd.	Khammam District, Andhra Pradesh	100
Coal, bituminous	million tons	Bharat Coking Coal Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Bihar and West Bengal	26
Do.	do.	Central Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Bihar	27
Do.	do.	Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Bihar and West Bengal	21
Do.	do.	Mahanadi Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Orissa	21
Do.	do.	North Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Assam	640
Do.	do.	Northern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh and Uttar Pradesh	24
Do.	do.	Singareni Collieries Co. Ltd. (Andhra Pradesh State Government, 50%, and Indian Government, 50%)	Andhra Pradesh	18
Do.	do.	South Eastern Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh	36

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Coal, bituminous-- Continued:	million tons	Western Coalfields Ltd. (a subsidiary of Coal India Ltd., Indian Government, 100%)	Madhya Pradesh and Maharashtra	18
Coal, lignite	do.	Neyveli Lignite Corp. Ltd. (Indian Government, 100%)	Tamil Nadu	17
Copper, mine		Hindustan Copper Co. Ltd. (Indian Government, 100%)	Indian Copper Complex mines, Ghatsila District, Bihar	31
Do.		do.	Khetri Copper Complex mines, Khetrinaga Rajasthan	15
Do.		do.	Malanjkhand Copper Complex mines, Balaghar District, Madhya Pradesh	22
Copper, metal		Birla Copper	Birla Copper Complex smelter, Dahej, Gujarat	150
Do.		Hindustan Copper Co. Ltd. (Indian Government, 100%)	Indian Copper Complex smelter-refinery, Ghatsila District, Bihar	20
Do.		do.	Khetri Copper Complex smelter-refinery, Khetrinagar District, Rajasthan	45
Do.		Sterlite Industries Ltd.	Tuticorin Smelter, Tamil Nadu	150
Ilmenite-rutile ore		Kerala Minerals and Metals Ltd. (Kerala State Government, 100%)	Chavara, Kerala	100
Do.		Indian Rare Earths Ltd. (Indian Government, 100%)	do.	200
Do.		do.	Ganjam, Orissa	220
Do.		do.	Manavalakurichi, Tamil Nadu	65
Do.		VV Minerals Ltd.	Kanyakumari, Tamil Nadu	130
Iron and steel:				
Crude steel		Visvesvaraya Iron and Steel Ltd. (Karnataka State, 60%; Steel Authority of India Ltd., Indian Government, 40%)	Bhadravati steel plant, Karnataka	180
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Bhilai steel plant, Madhya Pradesh	4,000
Do.		do.	Bokaro steel plant, Bihar	4,000
Do.		Indian Iron and Steel Co. Ltd. (wholly owned subsidiary of Steel Authority of India Ltd., Indian Government, 100%)	Burnpur steel plant, West Bengal	1,500
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Durgapur steel plant, West Bengal	1,600
Do.		Tata Iron and Steel Co. Ltd.	Jamshedpur steel plant, Bihar	3,200
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Rourkela steel plant, Orissa	1,800
Do.		Rashtriya Ispat Nigam Ltd.	Visakhapatnam steel plant, Andhra Pradesh	3,200
Do.		Ministeel plants (privately owned)	About 180 plants located throughout India	4,700
Iron ore		National Mineral Development Corp. Ltd. (Indian Government, 100%)	Bailadila, Madhya Pradesh	9,000
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Bastar and Durg District, Madhya Pradesh	7,000
Do.		Kudremukh Iron Ore Co. Ltd. (Indian Government, 100%)	Kudremukh, Chikmagalur District, Karnata	10,300
Do.		National Mineral Development Corp. Ltd. (Indian Government, 100%)	Donimalai, Karnataka	9,000
Do.		Chowgule and Co. Ltd.	Goa	2,500
Do.		Dempo Mining Corp. Ltd.	Goa	2,500
Do.		V.M. Salgaocar & Bros. Pvt. Ltd.	Goa	2,500
Do.		Sesa Goa Ltd.	Codli and Sonshi, Goa	NA
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	Kendujhar District, Orissa	3,000
Do.		Tata Iron and Steel Co. Ltd.	do.	2,000
Do.		Indian Iron and Steel Co. Ltd. (wholly owned subsidiary of Steel Authority of India Ltd., Indian Government, 100%)	Singhbhum District, Bihar	2,500
Do.		Steel Authority of India Ltd. (Indian Government, 100%)	do.	3,500
Do.		Tata Iron and Steel Co. Ltd.	do.	3,500
Kyanite		Associated Mining Co.	Bhandara District, Maharashtra	10
Do.		Maharashtra Mineral Corp. Ltd.	do.	10
Do.		Bihar State Mineral Development Corp. Ltd. (Bihar State Government, 100%)	Singhbhum District, Bihar	10
Do.		Hindustan Copper Co. Ltd. (Indian Government, 100%)	do.	22
Lead ore		Hindustan Zinc Ltd. (Indian Government, 100%)	Agnigundala Mine, Andhra Pradesh	72
Do.		do.	Sargipalli Mine, Orissa	150

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Lead:			
Primary	Hindustan Zinc Ltd. (Indian Government, 100%)	Chanderiya Smelter, Rajasthan	35
Do.	do.	Tundoo Smelter, Bihar	8
Do.	do.	Chanderiya Smelter, Rajasthan	35
Secondary	Indian Lead Co.	Thane Refinery, Mumbai, Maharashtra	25
Do.	do.	Wada, Mumbai, Maharashtra	40
Lead-zinc ore	do.	Rampura-Agucha Mine, Rajasthan	1,300
Do.	do.	Zawar mine group, Rajasthan	1,200
Magnesite	Burn Standard Co. Ltd. (Indian Government, 100%)	Salem, Tamil Nadu	150
Do.	Dalmia Magnesite Corp.	do.	150
Do.	Tamil Nadu Magnesite Ltd. (Tamil Nadu State Government, 100%)	do.	150
Manganese ore ²	Manganese Ore India Ltd. (Indian Government, 100%)	Adilabad, Andhra Pradesh	NA
Do.	Falechand Marsingdas	Andhra Pradesh	NA
Do.	Manganese Ore India Ltd. (Indian Government, 100%)	Balaghat, Madhya Pradesh	NA
Do.	J.A. Trivedi Bros.	do.	NA
Do.	Sandur Manganese and Iron Ores Ltd.	Bellary, Karnataka	NA
Do.	Manganese Ore India Ltd. (Indian Government, 100%)	Bhandara, Maharashtra	NA
Do.	Eastern Mining Co.	North Kanara, Karnataka	NA
Do.	Mysore Minerals Ltd.	do.	NA
Do.	Manganese Ore India Ltd. (Indian Government, 100%)	Keonjhar, Orissa	NA
Do.	Mangilah, Rungta (Pvt.) Ltd.	do.	NA
Do.	Orissa Mining Corp. Ltd.	do.	NA
Do.	Rungta Mines (Pvt.) Ltd.	do.	NA
Do.	Serajuddin & Co.	do.	NA
Do.	S. Lall & Co.	do.	NA
Do.	Tata Iron and Steel Co. Ltd.	do.	NA
Do.	Orissa Mineral Development Co. Ltd.	Koraput, Orissa	NA
Do.	Orissa Mining Corp. Ltd.	do.	NA
Do.	Mysore Minerals Ltd.	Shimoga, Karnataka	NA
Do.	Aryan Mining & Trading Corp.	Sundargarh, Orissa	NA
Do.	Orissa Manganese & Minerals (Pvt.) Ltd.	do.	NA
Do.	Tata Iron and Steel Co. Ltd.	do.	NA
Do.	R.B.S. Shreeram Durga Prasad and Falechand Marsingdas	Vizianagaram, Andhra Pradesh	NA
Petroleum, refined products thousand 42-gallon barrels per day	Cochin Refineries Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 55%; private interests, 45%)	Ambalamugal Refinery, Kerala	93,000
Do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%; private interests, 9%)	Barauni Refinery, Bihar	66,000
Do.	Bongaigaon Refinery and Petrochemicals Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 100%)	Bongaigaon Refinery, Assam	27,000
Do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%; private interests, 9%)	Digboi Refinery, Assam	12,000
Do.	do.	Guwahati Refinery, Assam	20,000
Do.	do.	Haldai Refinery, West Bengal	61,000
Do.	do.	Koyali Refinery, Gujarat	185,000
Do.	Madras Refineries Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 52%; private interests, 48%)	Madras Refinery, Tamil Nadu	131,000
Do.	Bharat Petroleum Corp. Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 67%; private interests, 33%)	Mahul Refinery, Mumbai, Maharashtra	135,000
Do.	Industan Petroleum Corp. Ltd. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 51%; private interests, 49%)	do.	110,000
Do.	do.	Visakhapatnam Refinery, Andhra Pradesh	90,000
Do.	Indian Oil Corp. (a subsidiary of Oil and Natural Gas Corp., Indian Government, 91%; private interests, 9%)	Mathura Refinery, Uttar Pradesh	156,000
Do.	do.	Panipat Refinery, Haryana	120,000

See footnotes at end of table.

TABLE 2--Continued
INDIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Phosphate rock ³	Rajasthan State Mineral Development Corp. Ltd. (Rajasthan State Government, 100%)	Badgaon, Dakankotra, Kanpur, Kharbaria-ka-Guda, and Sallopat Mines, Rajasthan	NA
Do.	Pyrites Phosphates and Chemicals Ltd.	Durmala and Maldeota underground mines, Uttar Pradesh	NA
Do.	Madhya Pradesh State Mining Corp. Ltd. (Pradesh State Government, 100%)	Hirapur and Khatamba Mines, Madhya Pradesh	NA
Do.	Rajasthan State Mines and Minerals Ltd. (Rajasthan State Government, 100%)	Jhamarkotra Mine, Rajasthan	NA
Do.	Hindustan Zinc Ltd. (Indian Government, 100%)	Maton Mine, Rajasthan	NA
Zinc	Binani Zinc Ltd.	Binanipuram Smelter, Kerala	38
Do.	Hindustan Zinc Ltd. (Indian Government, 100%)	Chanderiya Smelter, Rajasthan	70
Do.	do.	Debari Smelter, Rajasthan	59
Do.	do.	Visakhapatnam (Vizag) Smelter, Andhra Pradesh	40

^cEstimated. NA Not available.

¹Scheduled for startup in 2005.

²Capacity of clusters of surface mines varies extremely, depending on demand. Estimated total capacity is 1.5 million metric tons per year.

³Estimated total phosphate rock capacity is 800,000 metric tons per year.